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Spaceport News

America's gateway to the universe. Leading the world in preparing and launching missions to Earth and beyond.

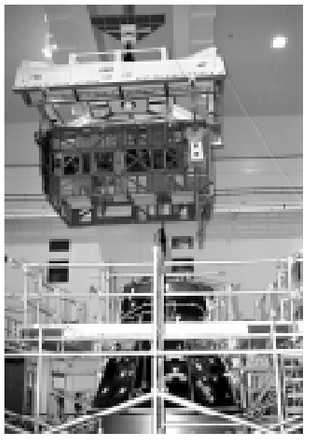
John F. Kennedy Space Center

Mission Update

STS-90

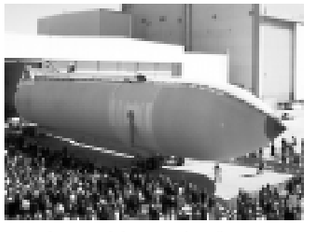
Getting ready — Members of the STS-90 flight crew conduct the Crew Equipment Interface Test (CEIT) inside the Neurolab module. Launch is targeted for April 2.

Integrated Equipment Assembly



More station hardware — In the Space Station Processing Facility, the newly arrived Photovoltaic Module 1 Integrated Equipment Assembly (IEA) (upper) is moved past a Pressurized Mating Adapter (lower). One of four integral units designed to generate, distribute and store power, the IEA will launch on STS-97 in April 1999.

Super lightweight tank



Ready to ship — The first super lightweight tank rolls out of the NASA Michoud Assembly Facility in New Orleans. It is due at KSC Feb. 3 to begin preparations for flight on STS-91, targeted for launch May 28.

Florida group pitches state as RLV launch site

Striving to make the Space Coast a primary launch site for an operational Reusable Launch Vehicle (RLV), a Florida contingent revealed its strategies to the public for the first time on Jan. 12 at the KSC Visitor Complex. One week later, the same RLV Working Group got a preview of the challenges that lay ahead and the competition chasing the same goal.

Participating in the effort are NASA managers, state and local business leaders, elected officials and representatives from economic development

(See RLV, Page 6)

STS-89 lights up the sky

THE SHUTTLE Endeavour cuts a bright swath as it heads toward the Russian Space Station Mir. Endeavour lifted off at 9:48:15 p.m. EST, Jan. 22, from Pad 39A. STS-89 is the eighth docking with Mir, the first for Endeavour. All previous dockings were made by Atlantis. This also marked the first flight of three Block IIA main engines, featuring a Large Throat Main Combustion Chamber (LTMCC) that reduces overall engine system pressures and temperatures. Endeavour is set to land at KSC Jan. 31 at 5:36 p.m., leaving Andy Thomas on Mir and returning David Wolf to Earth along with six other crew members.

First Russian station element shipped to launch site

The International Space Station completed a major milestone toward its first launch as the first station piece, a U.S.-funded and Russian-built control module, rolled out for shipment to the launch site in Kazahkstan.

The Control Module, formerly called the Functional Cargo Block and designated by the Russian acronym FGB,was rolled out from the Khrunichev State Research and Production Center in Moscow Jan. 17.

The 20-ton module is targeted for a late June launch to begin the five-year, 45-flight orbital assembly of the new space station. It will be launched on a Russian Proton rocket from the Baikonur Cosmodrome in Kazahkstan. The Control Module was built by Khrunichev under contract to The Boeing Company, the prime contractor to NASA for the International Space Station. It was to depart Khrunichev via a special rail car on a 1,200-mile, five-day train journey to Baikonur, where it was scheduled to begin five months of launch preparations and final testing.

"When the Control Module arrives at Baikonur, all of the elements for our first two launches will be undergoing final launch processing," International Space Station program manager Randy Brinkley said.

"The year of the International Space Station is 1998," Brinkley said. "This is something that all of us have looked forward to for a very long time. We have a lot of exciting and challenging activities ahead as we begin

(See Module, Page 6)

THE RUSSIAN-built Control Module undergoes assembly at the Krunichev State Research and Production Space Center last year. The aft docking mechanism, at right with ventilation ducting running through it, will dock with the third station element, the Russian Service Module.

KSC employees honored with patent award

An innovative approach to combating the corrosive seaside environment at Kennedy Space Center has led to a prestigious award for two KSC employees.

Karen Thompson and Coleman Bryan, both chemists for NASA at the space center, are members of a team recently honored with the 1997 Distinguished Patent Award by the Department of Energy's Los Alamos National Laboratory (LANL).

"It was very rewarding to have our patent chosen as the patent of the year from the many significant inventions that were brought to fruition at the LANL this year," observed Bryan after returning from an awards ceremony at Los Alamos.

U.S. Patent 5,658,649, entitled *Corrosion Resistant Coating*, was selected as the top patent from the 41 patents issued at LANL in 1997.

The formula for the coating features polyaniline as its active ingredient. Polyaniline is a polymer made by connecting many hundreds of molecules of aniline end-to-end by means of a chemical reaction.

The environment at KSC is one of the most corrosive in the continental United States. The two Shuttle launch pads are less than a mile from the Atlantic Ocean and are exposed daily to salt spray and humidity. Compounding the corrosive effect is hydrochloric acid and intense heat generated from a Space Shuttle launch, which attacks protective coatings on structures and machinery at the pads.

In 1986, KSC set out to formulate a conductive polymer coating that would be more protective than current materials. NASA KSC contracted with the Department of Energy's Los Alamos National Laboratory for assistance in the development work. The conductive polymer development effort has exceeded expectations and could revolutionize the coatings industry.

The idea of using conductive polymers to form corrsion-inhibiting coatings is very novel. Leaders in the field of electrically conductive polymers were initially skeptical about the concept of attempting to make coatings of such polymers, since their molecular structure makes it difficult to produce them in a form that can be sprayed or brushed onto a surface.

Also novel is the idea of using such materials to protect a substrate from corrosion. In fact, university experts specializing in the field of conductive polymers are working with NASA to better understand one test result, called "throwing power." Areas on metal samples coated with the new conductive polymer coating were scratched through to the bare metal and the samples immersed in aerated hydrochloric acid for 12 weeks.

Despite the rugged exposure, the bare metal showed very little corrosion. This throwing power of the new coating has been of great interest to industry, and NASA KSC is working with an industry partner to further develop the new coating.

And while the new conductive polymer coating was first developed for the space program, it may find applications around the world. The Navy is interested in the coating for submarine and aircraft carrier applications. The Admiral of the Pacific Fleet in charge of maintenance received a briefing on the new technology from Thompson, and the Navy has joined the project team and is funding additional testing for Navy applications.

The new coating could yield environmental and economic benefits for the United States. Most protective coatings manufactured today contain chromium, and Europe currently commands the chromate coating market.

The U.S. Environmental Protection Agency and its European equivalents are expected to ban the use of all coatings containing chromium by the year 2000 because of environmental concerns. The work being conducted at KSC in developing conductive-polymer coatings work represents the forefront of chromium-free coating technology. If the resultant coatings are able to replace chromium-containing coatings, benefits to the U.S. economy could be substantial.

As current coatings are banned from use (as planned) or restricted, the new conductive polymer coating will provide corrosion protection while reducing pollution. The new conductive coating does not contain metals and doesn't pollute soils. In contrast, current repair procedures involving metal-containing coatings can result in pollution of soils due to sandblasting debris. Also, controlling sandblast debris is very costly when large structures are involved.

"It has been rewarding to work with partners in two other government agencies, industry, and several universities in an effort where all team members have contributed in several areas of expertise to develop such a novel technology," Thompson said.

YEARS of diligent research were rewarded recently when KSC Chemists Cole Bryan (left) and Karen Thompson received the Distinguished Patent Award from the Department of Energy for their work on a new corrosion-inhibiting coating. They are shown here in a Materials Science Division laboratory in the Operations and Checkout Building, holding a sample coated with the new formula that has shown commercial potential.

Heart disease screening offered at area clinics

Screening for cardiovascular disease risk factors and diabetes will once again be held at KSC and Cape Canaveral medical clinics in February. No appointment is necessary for the testing, which will be offered as follows:

- **CCAS:** 6:30 – 8:30 a.m., Tuesday, Feb. 3, 10 and 24;
- **KSC Industrial Area:** 6:30 – 8:30 a.m., Wednesday, Feb. 4, 11, 18, and 24, and Tuesday, Feb. 17;
- **Launch Complex 39 Area:** 6:30 – 8:30 a.m., Thursday, Feb. 5, 12, 19 and 26, and 2 – 6 p.m., Thursday, Feb. 19.

Employees of the Month

HONORED IN JANUARY — From left, Edwin New, Payload Processing; Robert Preston, Safety and Mission Assurance; Elisa Artusa, Checkout and Launch Control System; Martin Steele, Installation Operations; Linda Euell, Chief Financial Officer's Office; and Nancy Hoffman, Administration Office. Not shown are Bud Sims, Chief Information Officer's Office; Astrid Heard, Engineering Development; Denise De Lapascua, Biomedical; William Roy, Logistics Operations; Joanne Seale, Procurement; Sue Gross, Shuttle Processing; and Darrell Foster, Space Station Hardware Integration.

African-American History Month

KSC will celebrate African-American History Month in February. This year's theme, *African-Americans as explorers, pioneers, and innovators: boldly working the path toward empowerment,* was selected to highlight the creative and innovative roles African-Americans have played in the nation's history, as well as spotlight the contributions they continue to make. Employees are invited to join in this year's observance and to participate in the planned activities:

Feb. 5:

• African-American History Month kick-off celebration, 9 - 10 a.m., Training Auditorium.

Feb. 12:

• *Meet the Directors* breakfast, 8:30 - 10 a.m., Space Station Processing Facility Cafeteria. Tickets are $6 per person, available from directorate representatives. Guest speakers will be James Spencer and Terrence Moore of Intelligent Machines Co., Titusville. Sponsored by the Black Employee Strategy Team (BEST).

Feb. 18 & 19:

• African-American Book Fair & Art Festival, 9 a.m. - 3 p.m., featuring African-American books, apparel and paintings, ceramic arts, and floral arrangements. On Feb. 18, it will be held in the Operations and Checkout Building Mission Briefing Room, and on Feb. 19, in the Launch Control Center Conference room, Rm. 1R29.

Correction: *The Jan. 16 issue of Spaceport News misidentified STS-87 Mission Commander Kevin Kregel in the photograph with Jim Harrington. We regret the error.*

19th annual FEW training seminars to be offered in February

The FEW Annual Training Program will be held Tuesday, Feb. 10, and Wednesday, Feb. 11, at the Doubletree Hotel (formerly the Howard Johnson Plaza Hotel) in Cocoa Beach.

The theme for this year is *Change is Opportunity: Re-create Your FEWture.* The program will be repeated on both days. Registration for the conference will be held from 7 a.m. until 8 a.m. in the lobby of the hotel, followed by a complimentary breakfast. The opening session will begin at 9 a.m. with a welcome by the President Sandy McCandless. Becky Fasulo, the seminar chair, will then introduce keynote speaker Joan Higginbotham, a NASA Astronaut Candidate (Mission Specialist) from KSC.

The morning sessions will begin at 10 a.m. and last for about two hours. Session titles and speakers are as follows:

• *Geometric Psychology*: Richard Lagesse, U. S. Army Space Command, Equal Employment Opportunity Manager, Colorado Springs, Colo.

• *We Create Tomorrows — We Make Choices*: Muriel Ware O'Tuel, Ph.D., Muriel O'Tuel Presentations, North Myrtle Beach, S.C.

• *Talk To Win*: Amanda Harris, director, Safety and Mission Assurance (S&MA) Office, NASA, Marshall Space Flight Center in Huntsville, Ala.

• *Developing Your Inner Voice*: Martha Tilyard, Tilyard Consulting, Greensboro, N.C.

Lunch will be served at 12:15 p.m. The afternoon sessions will begin at 2 p.m. and will be a repeat of the morning sessions.

Sexual harassment training offered to NASA KSC employees

The policy of KSC relating to sexual harassment is that it will not be tolerated in any form in the workplace.

Are you familiar with the different forms of sexual harassment? How much do you really know about charges of sexual harassment? Do you know what it is and what the legal liabilities are? Is your workplace free of sexual harassment?

Being a victim of sexual harassment can be a lonely and frightening experience. Many people do not know how to handle it or what to do if they think they are a victim.

Others are accused and can't understand why the other person was offended.

With sexual harassment charges so much in the news and in the courts, many people still need information. Please plan to attend the Sexual Harassment Prevention Training being offered on the following dates:

• **Feb. 11**, 8:30 a.m. to 10:30 a.m., or

• **Feb. 16**, 1:30 p.m. to 3:30 p.m.

The program will be held in the KSC Training Auditorium. These sessions are being offered to all NASA/KSC employees. Managers and supervisors are required to attend.

Come and learn not only the legal aspects, but the workplace relationships and practices that can lead to charges of sexual harassment.

This training will not only answer many questions about the definition of sexual harassment, but will help you understand how you, as an individual, can take preventive measures to keep from being a victim or being accused.

6th annual quality conference set for Feb. 23-24 in Houston

The 6th annual Conference on Quality in the Space and Defense Industries (CQSDI) will be held Feb. 23-24 at the Nassau Bay Hilton & Marina in Houston.

The theme for this year's event is *Adding value through quality: Yesterday, today and tomorrow*.

NASA Associate Administrator for Safety and Mission Assurance Fred Gregory has been invited to be the keynote speaker.

Topics to be covered include: What suppliers need to do about the new acquisition reform initiatives; real-life case studies of ISO 9000 certification and implementation; the new role of government oversight; and successful and innovative quality practices.

Dave Spacek, NASA KSC and Dick Beagley, USBI at KSC, are members of the 1998 CQSDI committee.

For more information, call 254 776-3550, fax 254 776-3767, or contact the conference management office via e-mail at sgmeet@mail.airmail.net.

A TEAM that includes both NASA and contractor personnel received the prestigious SFA Team Award in December.

KSC workers earn awards

Thirty-eight individual Silver Snoopy awards and one Space Flight Awareness (SFA) team award went to KSC employees in December.

The Silver Snoopy is given to less than one percent of the workforce. It is the highest honor bestowed by the astronauts. The following indiviuals at KSC were recognized:

NASA: Bennie Bell, Stacie Grega, Fred Head, Ira Kight, Cheryl Malloy, Enoch Moser, Shawn Quinn, Steve Coffman, Bob Saulnier, Cindy Coddington, and Ed Markowski;

EG&G: Robin Cosker, Ron Funk, Melody Gerhardt, Divina LeClair, Jim Morgan, Donna Pancho and Carmel Shearer;

Dynamac: Colleen Loader;

United Space Alliance: Jim Alpaugh, Rene Arriens, Dave Caldwell, Gary Carr, Charlie Hannas, Don Hammel, Tom Henning, Bill Marple, Ken May, David Ruegg, Diane Sterling and Terry White;

Boeing: John Bowen, Chuck Broughton and Jim Diehl;

Rocketdyne: Jeff Kirchel and Jeff Johnson;

Sherikon: Bob Barrows and Sam Davis;

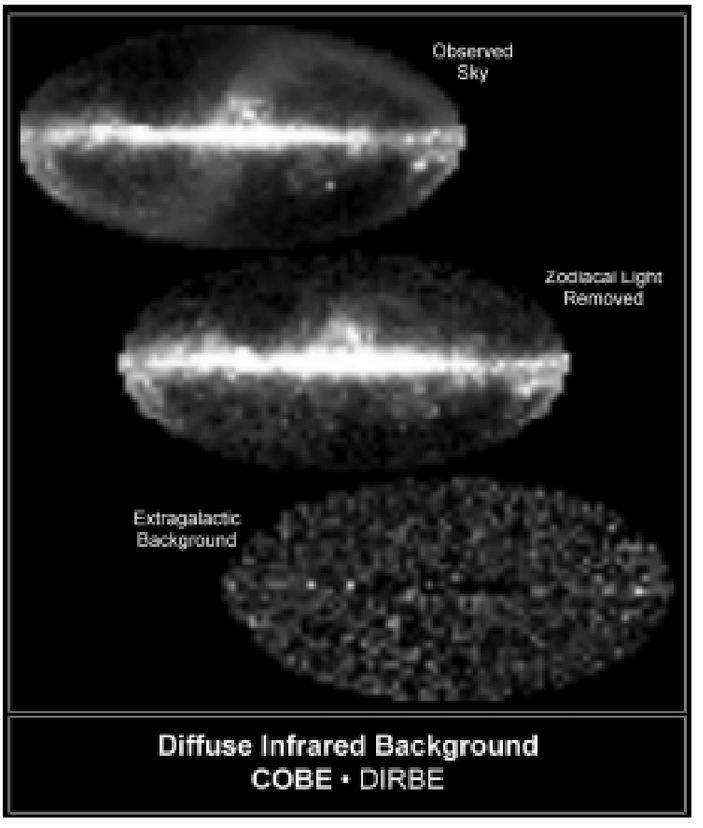
A 20-member NASA/ contractor team received the team award for its contribution to Shuttle processing. The **Thermal Protection System (TPS) Processing Integrated Work Control System (IWCS) Activity Team** has been meeting regularly for the past four years to integrate TPS systems and processing requirements into the IWCS strategic plan.

The team was drawn from across all line organizations involved in TPS processing. During the course of their work, they identified a number of areas where significant cost savings could be achieved.

Hope it wasn't a favorite!

CENTER Director Roy Bridges (right) performs the tradition of cutting the tie on new Launch Director Dave King in the Launch Control Center following the liftoff of the Shuttle Endeavour on STS-89 Jan. 22. The tradition has its origins in the military, when a pilot who completed his first solo flight went through the same rite of initiation. The STS-89 countdown and launch was King's first in his new role as launch director.

COBE discovery



LAUNCHED in 1989, NASA's Cosmic Background Explorer (COBE) has gathered data that indicates there is a background infrared glow across the sky produced by dust warmed by all the stars that have existed since the beginning of time. The discovery culminates several years of meticulous analysis of data gathered by the Diffuse Infrared Background Experiment on COBE. For scientists, the discovery is like turning out all the lights in a room only to find the walls, floor and ceiling aglow with an eerie luminescence. The difficulty of verifying the fossil radiation's existence was akin to listening for a faint background hum in a noisy shopping mall. It means a surprisingly large amount of starlight in the universe cannot be seen directly by today's optical telescopes, perhaps due to stars being hidden in dust, or being too faint or far away to be seen.

STS-87 student experiment gets high marks from participants

(Reprinted courtesy of *Roundup*, the Johnson Space Center newsletter.)

U.S. and Ukrainian high school students became unofficial members of the STS-87 crew when they participated in a plant science experiment during the Nov. 19 – Dec. 5 mission last year.

While the students built simulated flight hardware and studied plant growth, pollination and fertilization of the Brassica rapa plant in classrooms on Earth, Payload Specialist Leonid Kadenyuk of the Ukraine was working on the same plant experiment in the microgravity environment aboard the Shuttle Columbia.

The educational activities, a significant component of the Collaborative Ukrainian Experiment (CUE) payload, were known as Teachers and Students Investigating Plants in Space, or CUE-TSIPS.

"They were all here at the Kennedy Space Center recently for a wrap-up symposium," said Tom Dreschel, CUE education coordinator for KSC. "The teachers had a lot of good stories about their involvement. All the teachers felt it was a very good program. Every student that they had participating in the project got something valuable from it, learned something from the project."

Until recently, plants grown in space from seeds failed to produce new seeds. Astronaut Michael Foale, aboard the Russian Space Station Mir, used a new technique with a dead bee glued to the end of a toothpick to pollinate plants and successfully produced the first seed-to-seed experiment in microgravity. That same technique was replicated on the Shuttle during STS-87 and in schools across the United States and Ukraine.

Dreschel, who worked closely with Principal Investigator Mary Musgrave of Louisiana State University and Paul Williams and Vladimir Nazarenko, the education coordinators for CUE, participated in the teacher workshops that preceded the in-flight activities and coordinated meetings between teachers and scientists. He said about 20 teachers gathered at KSC to share what each school did as well as early results of the Earth-bound plant growth.

"The combination of classroom activities and the fact that the activities were tied to an experiment in the Space Shuttle really got the students involved," Dreschel said. "There was a whole range of how well the plants did. Some of the teachers said it was the poorest set of plants they ever grew, and some of them said they did quite well. It was a learning experience. The students were very excited by the fact that they were participating in a NASA experiment.

"We're getting the same feelings from the people in the Ukraine," he added. "We had nine students here from the Ukraine for the launch. They were just in awe of everything they saw there, and got to meet Ukrainian President Leonid Kuchma while they were here."

As part of the STS-87 mission events, the Ukrainian and U.S. students participated in a 30-minute downlink session from the Shuttle and studios at Johnson Space Center, KSC and Kiev, Ukraine, asking questions about similarities and differences in the way the plants grew on orbit and on the ground.

CUE was the first cooperative scientific payload between NASA and the National Space Agency of Ukraine. Payload Specialist Leonid Kadenyuk was the primary payload specialist and the first Ukrainian to fly aboard a U.S. Shuttle. Here he works with the CUE Brassica rapa plants on Columbia's middeck.

Questions ranged from whether the plants and their blossoms remained the same on orbit as on Earth to whether Kadenyuk was having the same trouble keeping his bees used to help pollinate the plants attached to the sticks.

Musgrave is still in the process of evaluating the data, Dreschel said, and comparing the height measurements of Earth-grown plants with those grown on orbit. The students also are still reviewing data.

Russian Phase I manager may also get ride on Shuttle

John Glenn to return to space on STS-95 this fall

With U.S. Senator John Glenn already booked to fly on the Shuttle this October, another surprise guest also may get a ride into space this year: Valeriy Ryumin, Russian Phase I Mir-Shuttle Program manager.

The Russian Space Agency has nominated Ryumin, a spaceflight veteran, to fly the final mission to dock with Mir. He already is training with the STS-91 crew at Johnson Space Center.

Ryumin has spent 362 days in space over three missions. He first flew in 1979 on the Soyuz 25 mission, then on the Soyuz 32 mission to Salyut 6 (a 175-day stay in 1979) and for the last time as a member of the Soyuz 35 mission that lasted 185 days in 1980.

Glenn was the first American to orbit the Earth, completing a three-orbit flight on Feb. 20, 1962. He did not fly in space again, but remains an active pilot.

At least eight NASA crew members over 55 years old have flown multiple missions. Story Musgrave was 61 years old when he flew on STS-80 in 1996, his sixth spaceflight. Shannon Lucid was 54 years old when she completed her record-breaking stay aboard Mir in 1996.

JOHN GLENN (left) came to KSC for the STS-89 launch earlier this month. Showing him around the orbiter Columbia in Orbiter Processing Facility Bay 3 is astronaut Steve Oswald, now the deputy associate administrator for Space Flight at NASA Headquarters.

RLV ...

(Continued from Page 1)

organizations. The ad hoc bipartisan assembly was convened by U.S. Representative Dave Weldon last year.

The operational single-stage-to-orbit RLV envisioned by NASA will not drop boosters and a fuel tank like the Space Shuttle does during ascent, so there is no requirement to launch over the sea. When potential RLV contractors announced plans to build a new generation of low-cost RLVs that could launch from sites other than Cape Canaveral, the Weldon group kicked off the state-wide initiative to retain Florida's status as the spaceport of choice.

At present, contractor Lockheed Martin Skunk Works, Palmdale, Calif., is proposing a 127-foot-long-by 128-foot wide vehicle dubbed Venture Star to meet NASA's RLV program needs. Its half-scale prototype, X-33, is already under construction and will demonstrate RLV technologies with 15 test flights from California, Utah and Montana in 1999.

Venture Star's primary launch site will be announced in late 1999 and flights are slated to begin in 2004.

"It may be that you could fly a RLV somewhere else, but when trying to become a commercial success — why take on the challenge that it presents," said KSC Director Roy Bridges at the public meeting. "The KSC workforce knows more about reusable launch vehicles than anyone else in the world and we stand committed with our partners to help bring the program here in Florida."

Bridges further outlined the space center's strategic goal to reduce the cost of getting a pound of payload into orbit and touted the advantage of the federally funded infrastructure already in place at KSC.

He further clarified plans to join forces with Patrick Air Force Base and Cape Canaveral Air Station to bring RLV launches to the Space Coast.

RLV Working Group member Spaceport Florida Authority (SFA) emphasized, however, that even with NASA and Air Force support, local communities will have to do their part. "If we're going to have space as part of our economy, state and local government and economic development groups will have to come together," said Ed O'Connor, the state agency's director. SFA has already obtained $4 million in state funds for a 50,000-square foot RLV hangar and apron at KSC's Shuttle Landing Facility.

Attracting aerospace business to the Space Coast is the job of Brevard's Economic Development Commission. According to Lynda Weatherman, president of the Brevard EDC, "The product or venue may change, but every company wants to lower their cost of doing business." Property tax abatement, job tax credit, training dollars and grants are among the cost-saving incentives that are now available to businesses looking to invest in Brevard.

With interest from several states besides Florida as well as foreign countries clearly apparent, Lockheed Martin hosted a workshop in Palmdale, on Jan. 22 to inform potential launch site hosts of Venture Star's launch requirements.

"In comparison to the requirements that were laid out, KSC stacks up very well," reported KSC's RLV Director, Warren Wiley, upon return from Palmdale. "Additional launch facilities will be needed and Eastern Test Range flexibility will be key, but we have a proven team that is ready to meet these challenges and get the job done."

Representatives from eight other states besides Florida also attended the workshop in Palmdale.

NASA orders second X-34 flight vehicle

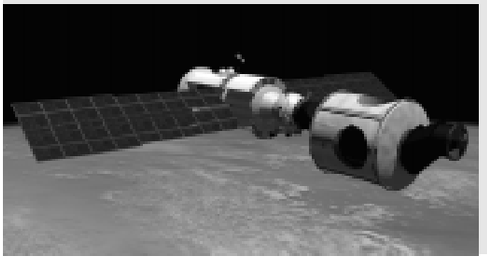
NASA has ordered a second X-34 from prime contractor Orbital Sciences Corp.The primary purpose is to reduce program risk. X-34 test objectives also are being expanded, including unpowered flight tests. A second vehicle also allows testing requiring repetitive flights to occur at the same time as tests which require major time-consuming changes to the vehicle. Shown here is the first X-34 airframe at Orbital Science's Dulles, Va., plant.

Module ...

(Continued from Page 1)

our assembly in orbit. The incredible efforts of a worldwide engineering and development team will be coming to fruition, and a new, unprecedented phase of space construction will begin."

Shortly after the control module is launched from Russia, Endeavour will launch on Mission STS-88 from KSC with the second piece of the station, the connecting module called Node-1, built by Boeing at NASA's Marshall Space Flight Center. Endeavour's crew will dock the Control Module to the node and perform three spacewalks to make final connections between the two components. The station will then await the launch of the Russian-built Service Module, a component that will become the early living quarters, targeted for December. The Control Module will provide early power and propulsion for the station as well as the capability to remotely rendezvous and dock with the Service Module.



THIS artist's concept shows the U.S.-built Node 1 (with Pressurized Mating Adapter attached) at right, and the Russian-built Functional Cargo Block (now called the Control Module) after they have been connected on-orbit.

John F. Kennedy Space Center

Spaceport News

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